Wellness Intelligence System

Project Report

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CSF213 Object Oriented Programming

First Semester 2025-26

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Abstract

A Java-based desktop program called Wellness Tracker was created to assist users in tracking important aspects of their own health, such as daily hydration, calorie expenditure, and BMI. The system fills the need for an easy-to-use yet powerful tool for tracking exercise and upholding healthy habits. Users can set personal calorie and water intake goals, add multiple exercises, monitor the number of calories burned during each activity, and see the remaining daily targets. In order to help users reach a calorie deficit if desired, the application also computes maintenance calories. It has visual charts for calorie analysis, file handling for data persistence, and an easy-to-use Swing-based graphical user interface. Throughout, object-oriented concepts like inheritance, interfaces, and exception handling are used. All things considered, the Wellness Tracker offers an easy-to-use platform for controlling individual fitness and wellness routines.

Introduction

Background and Inspiration

People are looking for tools to monitor weight goals, track daily fitness activities, and stay hydrated as they become more conscious of their own health. There is a need for straightforward desktop applications that are appropriate for students and novices learning software design, but many fitness apps are mobile-based.

Goals and Scope

This project's objective is to create a Java Swing application that lets users monitor their BMI, water intake, calories burned, and fitness objectives. A graphical user interface, file storage, visualization charts, and a modular object-oriented design utilizing inheritance and interfaces are all included in the scope.

System Analysis and Design

Functional Requirements

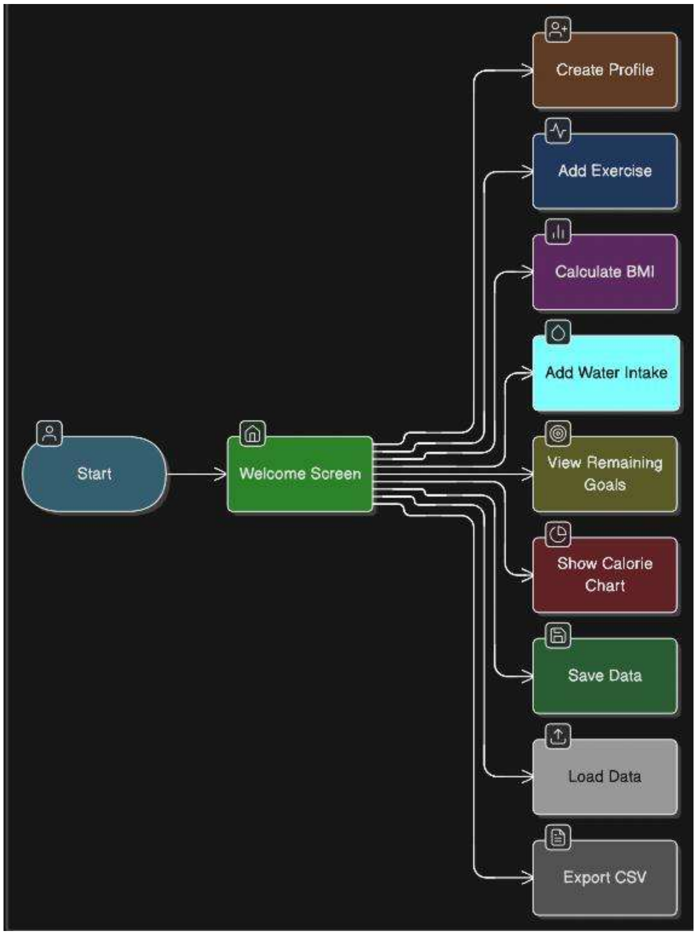
- Calculate BMI based on height and weight

- Estimate calories burned for specific exercises
- Track multiple users
- Save and load user data
- Track daily water intake
- Set goals (calorie + water) and show remaining water intake and calories
- Visualize calories burned using charts
- Present a welcome screen

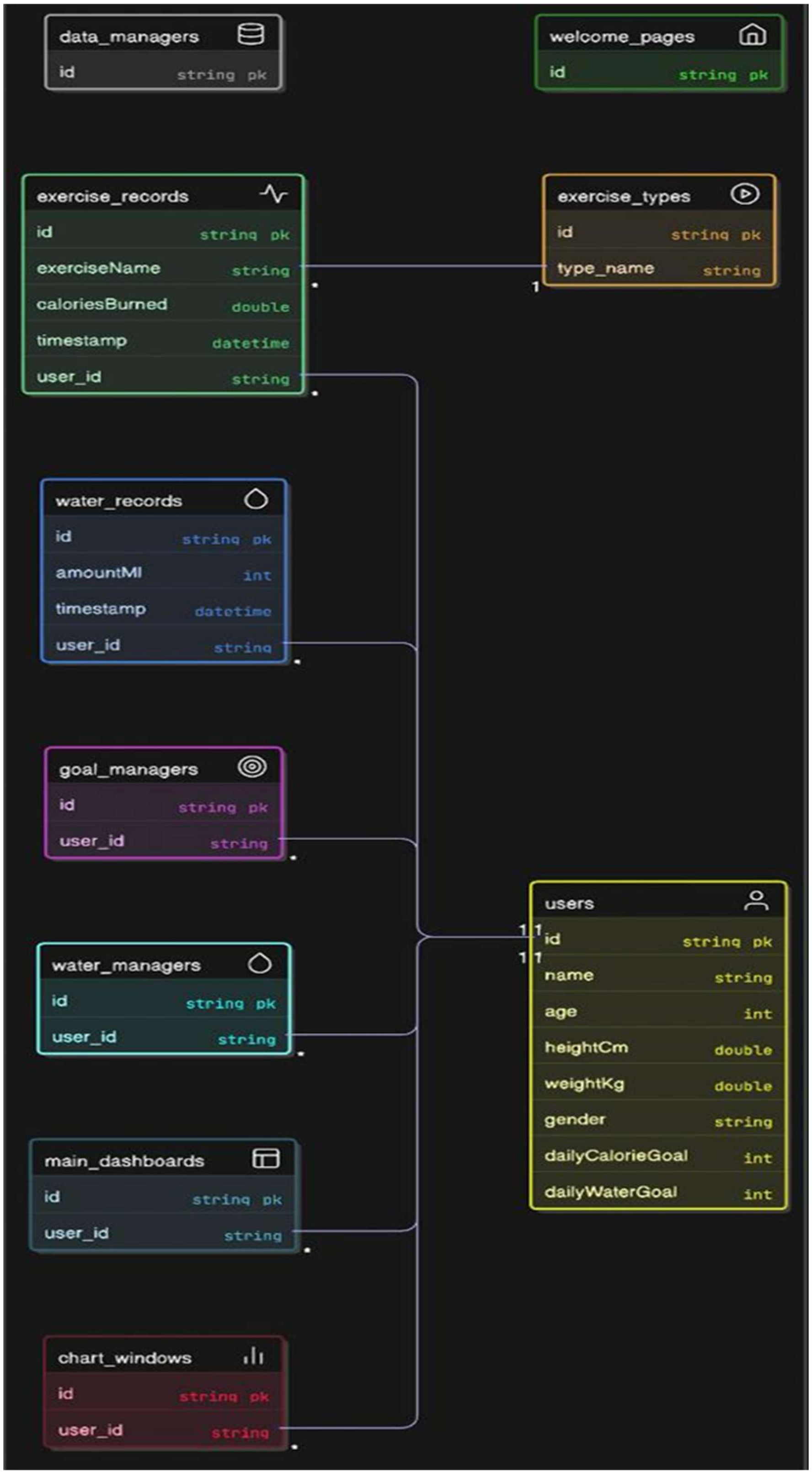
Non-Functional Requirement

- Data should persist between sessions
- Code must adhere to OOP principles
- The system should gracefully handle invalid input
- The GUI should be aesthetically pleasing and easy to use

Case diagram for system's design



Class diagram for classes, methods and relationships among all



data_managers	
id	string pk

welcome_pages	
id	string pk

exercise_records	
id	string pk
exerciseName	string
caloriesBurned	double
timestamp	datetime
user_id	string

exercise_types	
id	string pk
type_name	string

water_records	
id	string pk
amountMl	int
timestamp	datetime
user_id	string

goal_managers	
id	string pk
user_id	string

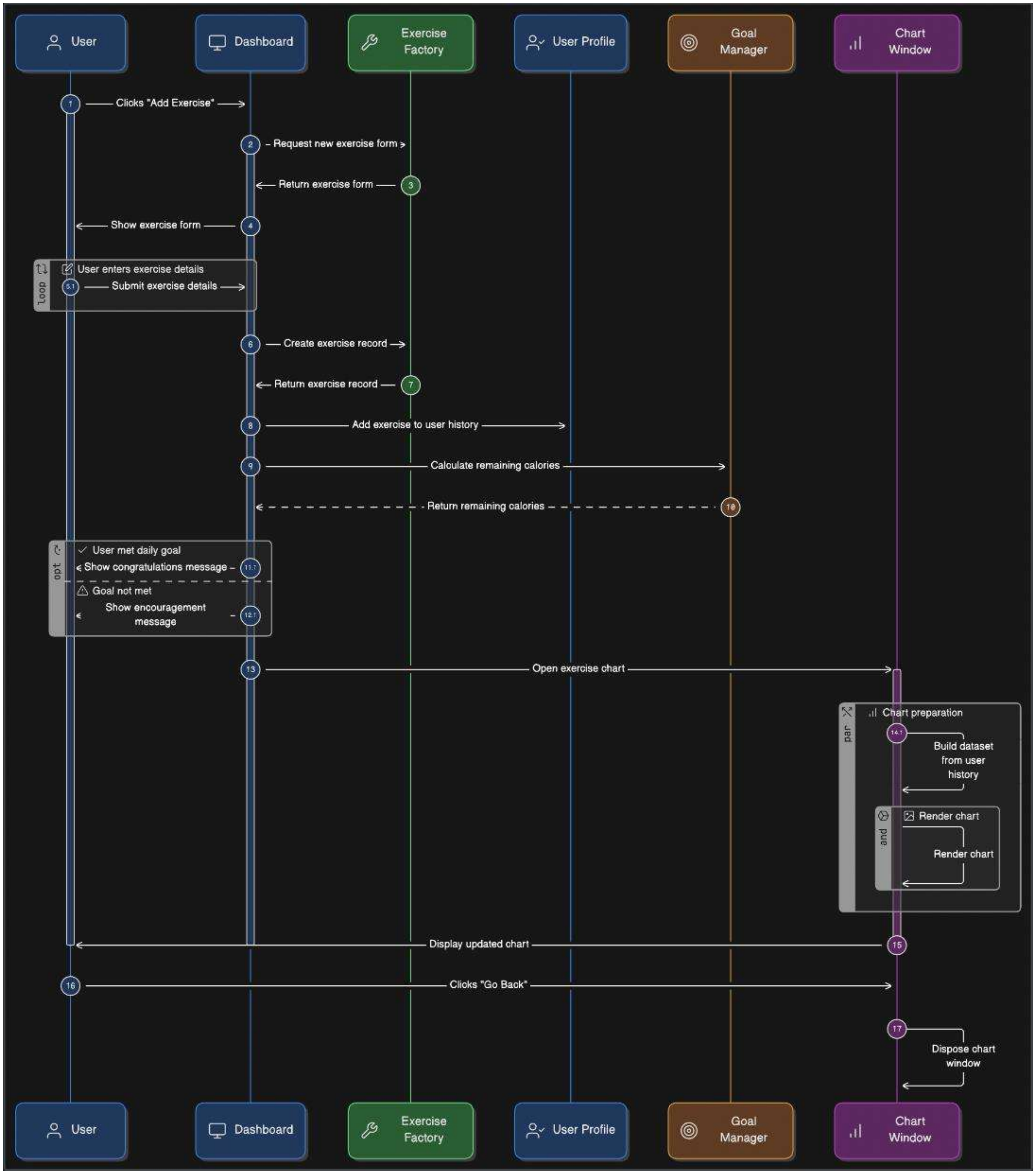
water_managers	
id	string pk
user_id	string

main_dashboards	
id	string pk
user_id	string

chart_windows	
id	string pk
user_id	string

users	
id	string pk
name	string
age	int
heightCm	double
weightKg	double
gender	string
dailyCalorieGoal	int
dailyWaterGoal	int

Implementation



The above diagram shows how the tracker operates through user inputs and presents the desirable outputs for every specific requirement after calculations.

Important Algorithms/Formulas:

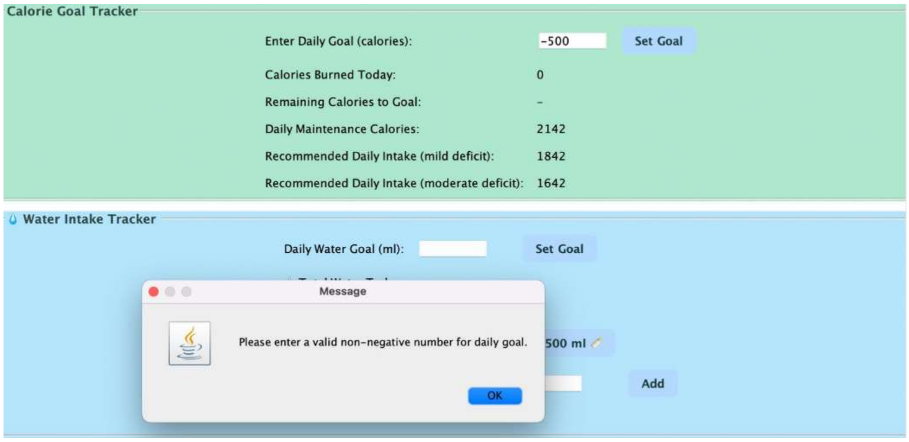
- BMI: weight(kg) / (height(m) * height(m))
- Calories from MET (metabolic equivalent of task) (example): calorie = MET * 3.5 * weight(kg) / 200 * duration(min) (for 60 minutes use 60)
- Mifflin–St Jeor (BMR):
  Male: BMR = 10*weight + 6.25*height - 5*age + 5
  Female: BMR = 10*weight + 6.25*height - 5*age – 161
- Maintenance estimate: maintenance = BMR * 1.4 (light activity multiplier)
- Deficit suggestions: maintenance - 300 (mild), -500 (moderate)

Main Concepts used:

- Inheritance
  Exercise types such as Running, Swimming, and Walking extend a common parent or implement a shared method.

- Interfaces
  IExercise defines the calorie calculation behavior, implemented differently in each exercise class.

- Exception Handling
  Custom exceptions handle invalid numeric inputs and empty fields.



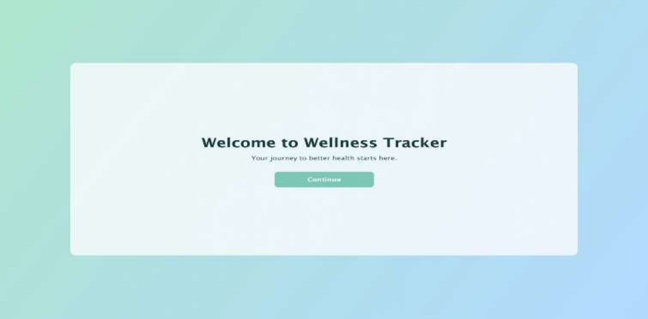
Enter Daily Goal (calories): -500
Calories Burned Today: 0
Remaining Calories to Goal: -
Daily Maintenance Calories: 2142
Recommended Daily Intake (mild deficit): 1842
Recommended Daily Intake (moderate deficit): 1642

Daily Water Goal (ml):

Please enter a valid non-negative number for daily goal.

- GUI Components (Java Swing)
  JFrame, JPanel, JButton, JComboBox, JList
  Chart display window

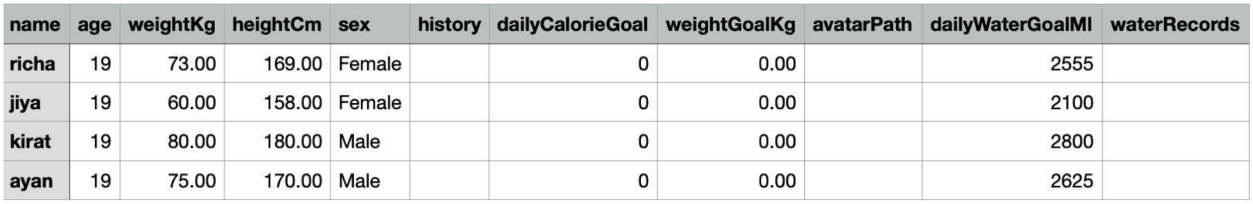
Aesthetic welcome page with pastel colors



Welcome to Wellness Tracker

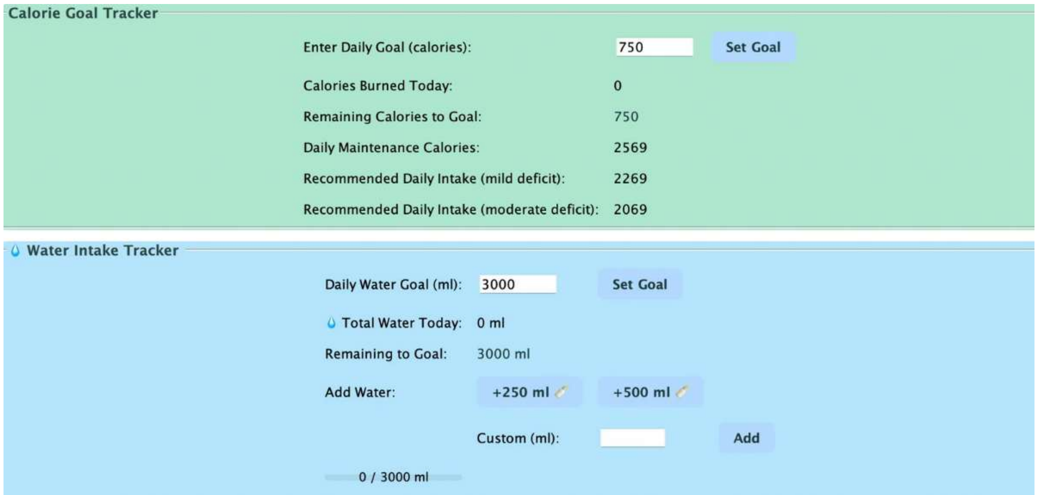
Your journey to better health starts here.

- File Handling
  Users are saved and loaded through serialization or JSON, enabling persistent storage.



name	age	weightKg	heightCm	sex	history	dailyCalorieGoal	weightGoalKg	avatarPath	dailyWaterGoalMl	waterRecords
richa	19	73.00	169.00	Female		0	0.00		2555	
jiya	19	60.00	158.00	Female		0	0.00		2100	
kirat	19	80.00	180.00	Male		0	0.00		2800	
ayan	19	75.00	170.00	Male		0	0.00		2625	

- Modular Code Design
  Managers handle goals, water tracking, and saving/loading to keep logic separate from UI.
  Tracker (Calorie and Water intake):



Calorie Goal Tracker

Enter Daily Goal (calories): 750

Calories Burned Today: 0

Remaining Calories to Goal: 750

Daily Maintenance Calories: 2569

Recommended Daily Intake (mild deficit): 2269

Recommended Daily Intake (moderate deficit): 2069

💧 Water Intake Tracker

Daily Water Goal (ml): 3000

💧 Total Water Today: 0 ml

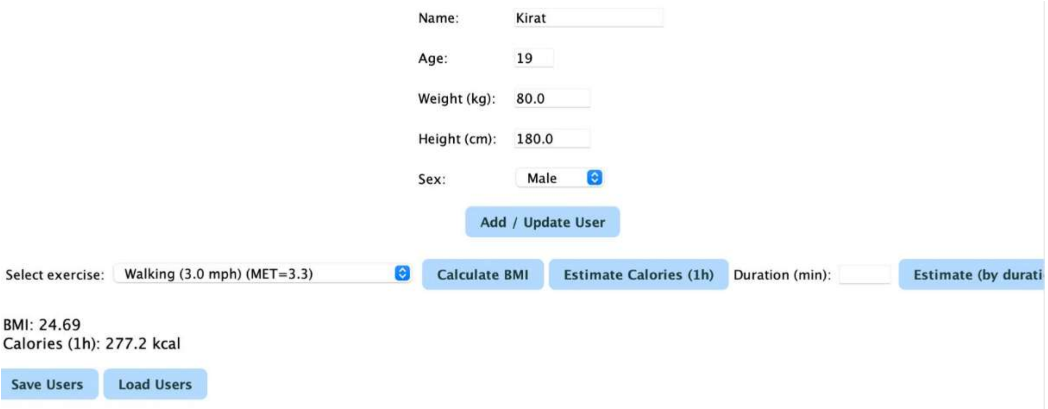
Remaining to Goal: 3000 ml

Add Water:

Custom (ml):

0 / 3000 ml

User Input Management:



Name: Kirat

Age: 19

Weight (kg): 80.0

Height (cm): 180.0

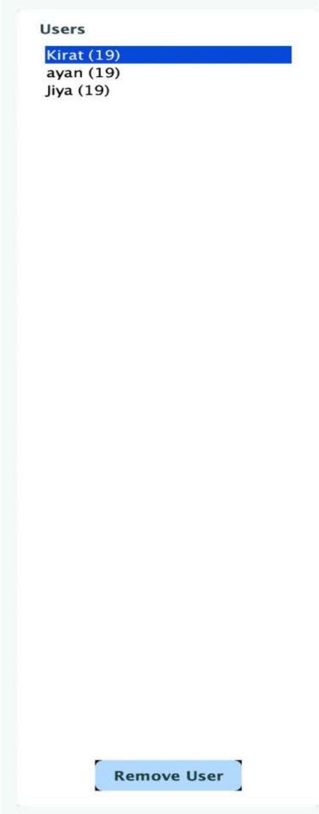
Sex: Male

Select exercise: Walking (3.0 mph) (MET=3.3)

Duration (min):

BMI: 24.69
Calories (1h): 277.2 kcal

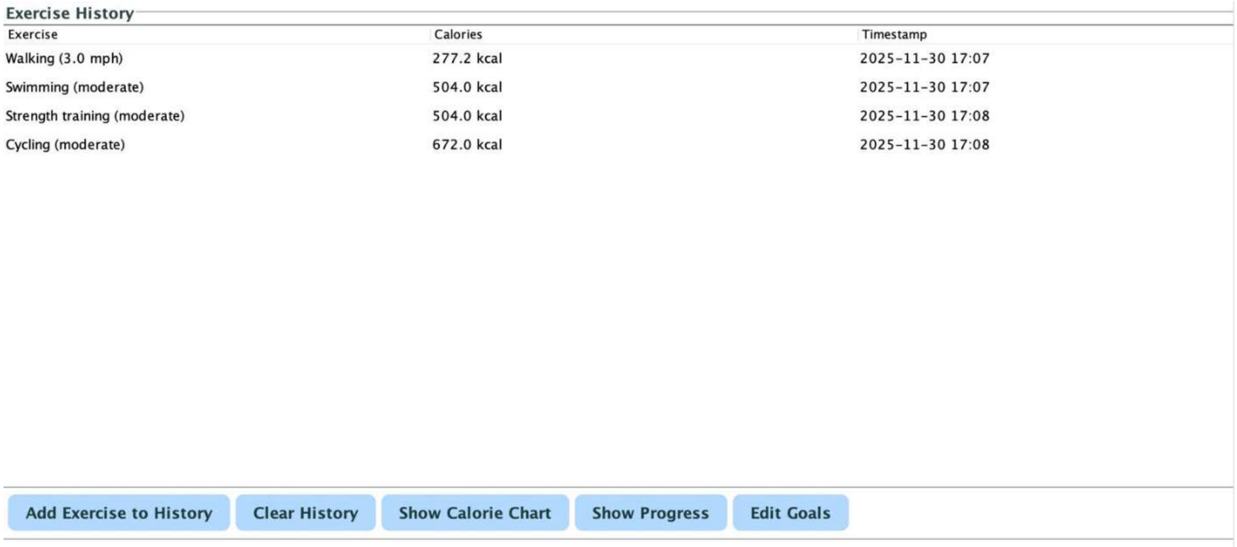
Multi-user Management:



Users

Kirat (19)
ayan (19)
Jiya (19)

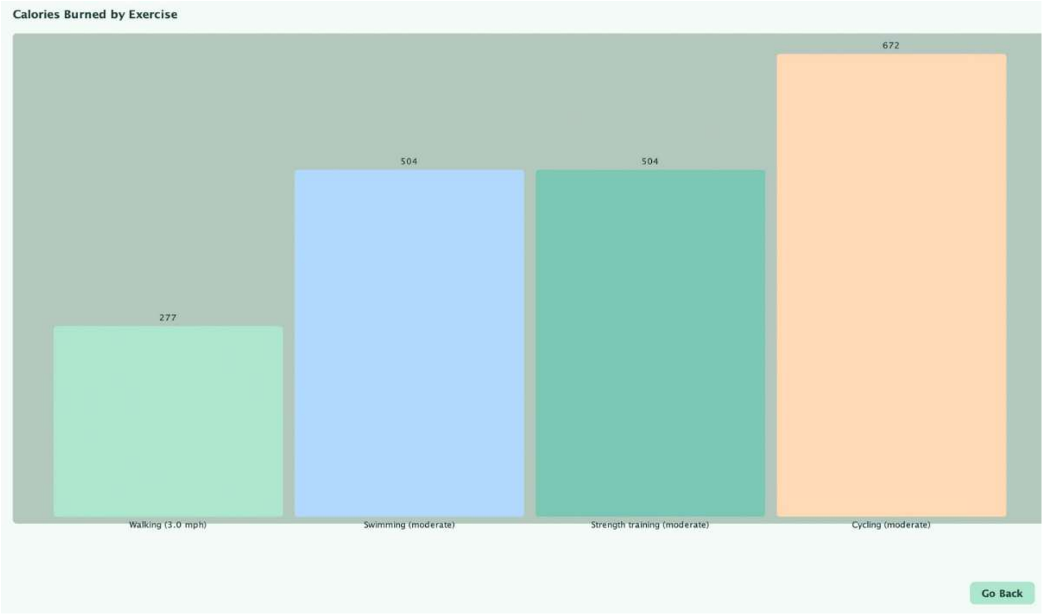
Exercise Tracking:



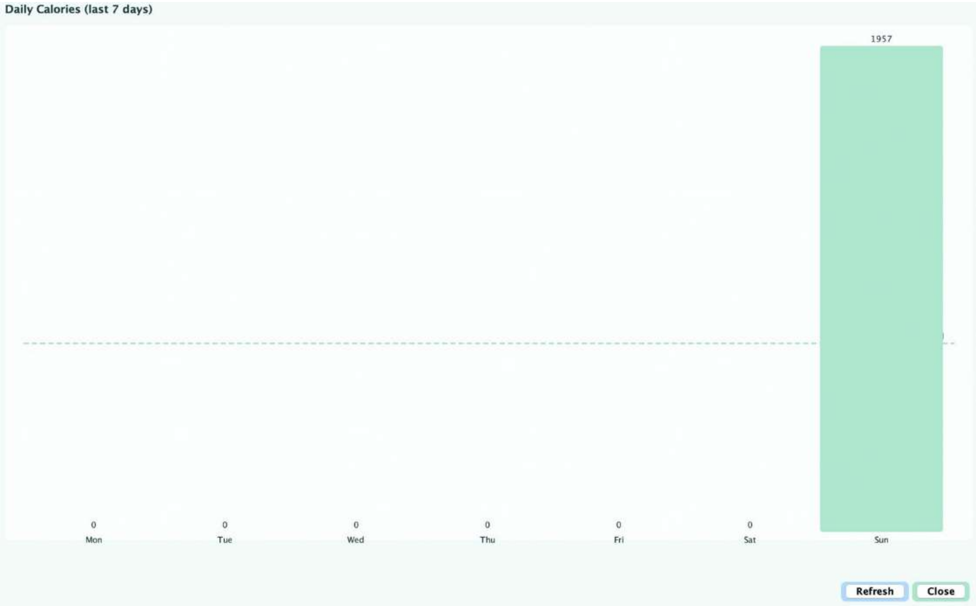
Exercise History

Exercise	Calories	Timestamp
Walking (3.0 mph)	277.2 kcal	2025-11-30 17:07
Swimming (moderate)	504.0 kcal	2025-11-30 17:07
Strength training (moderate)	504.0 kcal	2025-11-30 17:08
Cycling (moderate)	672.0 kcal	2025-11-30 17:08

Daily calorie burn chart:



Weekly progress calorie burn chart:



Conclusion and Future Work

Summary of Achievements

- Designed and implemented a user-friendly wellness tracking application
- Used Java Swing to build multiple GUI screens
- Integrated calorie estimation, BMI calculation, and hydration tracking
- Implemented data persistence with save/load functionality
- Applied core OOP principles: inheritance, interfaces, abstraction, exception handling
- Added bar chart visualization for calories burned

Future Enhancements

- Add weekly summaries and progress timelines
- Add streaks, achievements, and motivational notifications
- Add theme support (light/dark mode)
- Add reminders for exercise and hydration

- Implement a mobile or web version
- User authentication
- Create embedded data base
- Recommend exercises
- Provide suggestions regarding food intake according to calorie goals
- Integrate with wearable exports (example- smart watches)

References

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